



Agency for Healthcare Research and Quality
Advancing Excellence in Health Care



NATIONAL
GUIDELINE
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General

Guideline Title

Hydration management.

Bibliographic Source(s)

Mentes JC, Kang S. Hydration management. Iowa City (IA): University of Iowa College of Nursing, John A. Hartford Foundation Center of Geriatric Nursing Excellence; 2011 Apr. 43 p. [136 references]

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Mentes JC. Hydration management. Iowa City (IA): University of Iowa Gerontological Nursing Interventions Research Center, Research Dissemination Core; 2004 Feb. 43 p.

Recommendations

Major Recommendations

The evidence grade rating scheme (A-D) is provided at the end of the "Major Recommendations" field.

Assessment Criteria

The following screening criteria indicate patients who are likely to benefit the most from use of this protocol:

- All individuals >85 years of age
- All institutionalized elders
- Individuals with recent weight loss $\geq 5\%$ of body weight
- Individuals with feeding/eating difficulties
- Individuals with a diagnosis of dementia
- Individuals with congestive heart failure
- Febrile individuals

Essential Areas for Assessment of Hydration Status in the Elderly

(See Appendix A.1 in the original guideline document for an example of an assessment form that can be used.) Several areas are essential to assess with regard to the hydration status of elders. These include a health history, physical assessment, laboratory tests, functional assessment and individual fluid intake behaviors.

Health History

Health history may be obtained through interview or by reviewing the patient's record. It should include (EG = C1):

- Specific disease states: dementia, congestive heart failure, chronic renal disease, malnutrition, and psychiatric disorders such as depression, schizophrenia, and bipolar disorder.
- Presence of co-morbidities: >4 chronic health conditions
- Prescription drugs: number and types
- Past history of: dehydration, overhydration, repeated infections

Physical Assessments

Components of physical assessments that are essential to include are (EG = C1):

- Vital signs
- Height-weight
- Body mass index (BMI) which can be calculated from height and weight with the following formula: weight in kg. divided by height in m². BMI <21 or >27 puts an individual at risk (EG = D). Recent evidence suggests that a lower BMI confers risk (EG=C1).
- Review of Systems or Head to Toe Assessment--Make sure to include an assessment of the oral cavity, upper body strength and speech (EG = C1).
- Additional signs of hydration status and the relative strength of each in assessing dehydration are in Table 1 in the original guideline document.

Laboratory Tests

Many laboratory tests can be helpful in assessing hydration status in the elderly (see Table 2 in the original guideline document). It should be noted that the blood tests are better predictors of actual dehydration and the urine tests are better at predicting impending dehydration or those patients at risk for developing dehydration and it is important to obtain a baseline value for comparison and evaluation of significant changes (EG = B2; EG = D; EG = C1). Saliva analysis for osmolality has been explored and appears promising although no normative values have been established (EG = B2). Bioelectrical Impedance Analysis has been used to estimate total body water in research studies (EG = C1).

Functional Assessments

Cognitive impairments, functional dependence and depression have all been identified as risk factors for dehydration in the elderly, therefore the following assessments are recommended:

- Cognitive screening (one of the following): Mini Mental State Exam (MMSE), Short Orientation Memory Test, Short Portable Mental Status Questionnaire (SPMSQ), Minimum Data Set (MDS) Cognitive Performance Scale
- Activities of daily living (ADLs) (one of the following): Katz ADLs, Functional Independence Measure (FIM), ADL section from Resident Assessment Instrument of MDS, Barthel Index
- Mood (one of the following): Geriatric Depression Scale (GDS), Beck Depression Scale, Cornell Scale for Depression in Dementia

Individual Fluid Intake Behaviors

An individual's fluid intake behavior is important to assess. When assessing the individual's usual fluid intake pattern ask the following:

- Do they consume most of their fluids during meals?
- At what time of the day do they consume the most fluids?
- What is the actual amount of fluid intake?
- What types of fluids are preferred?

Assess any problematic behaviors associated with fluid intake. These include choking, drooling, spilling, visual impairment, inability to hold a cup independently, or resistance to drinking due to fear of incontinence (EG = C1).

Description of Intervention

The hydration management intervention is an individualized daily plan to promote adequate hydration based on risk factor identification that is based on a comprehensive assessment. The intervention is divided into three phases:

1. Risk identification phase
2. Hydration management phase

3. Evaluation phase

Risk Identification

Based on the assessment data, a risk appraisal for hydration problems is completed using the Dehydration Risk Appraisal Checklist revised by Menten & Wang (EG = C1). The more of the following risk indicators that are present, the greater the likelihood of dehydration: Specifically, history of dehydration and difficulty swallowing were risk factors for dehydration (EG = C1) (see the "Dehydration Risk Appraisal Checklist" in the original guideline document).

Another way to conceptualize risk for dehydration is to classify oral hydration habits.

See Figure 1 in the original guideline document details the different strategic measures according to the residents' drinking habits (EG = C1). The tailored guide can be helpful in maximizing hydration for each individual patient.

Hydration Management

Managing fluid intake for optimal fluid balance consists of 1) acute management of oral intake and 2) ongoing management of oral intake.

Acute Management of Oral Intake

Any resident who develops a fever, vomiting, diarrhea or a non-febrile infection should be closely monitored by implementing intake and output records and provision of additional fluids as tolerated (EG = C1). Individuals who are required to be NPO (nothing by mouth) for diagnostic tests should be given special consideration to shorten the time that they must be NPO and should be provided with adequate amounts of fluids and food when they have completed their tests. For many procedures a 2 hour fluid fast is recommended (EG = B1).

Any resident who develops unexplained weight gain, pedal edema, neck vein distension or shortness of breath should be closely monitored for overhydration. Fluids should be temporarily restricted, and the resident's primary care provider will be notified.

Ongoing Management of Oral Intake

Ongoing management of oral intake consists of the following five components:

1. Calculate a daily fluid goal

All residents need to have an individualized fluid goal determined by a documented standard for daily fluid intake. There is evidence that the standard suggested of 100mL/kg for first 10kg of weight, 50 mL/kg for next 10kg, and 15mL for remaining kg or 75% of 1600 mL per m² of body surface/day is preferred.

- Since this standard reflects fluid from all sources, to calculate a standard for fluids alone, 75% of the total calculated from the formula can be used. Other standards include:
 - 1600mL per m² of body surface/day (or more recently 75% of this standard) (EG = C1)
 - 30mL/kg body weight with 1500mL/day minimum (EG = D)
 - 1mL/kcal fluid for adults (EG = D)
 - No less than 1600 mL/24 hours (EG = A1)

2. Compare resident's current intake to the amount calculated from applying the standard.

3. Provide fluids consistently throughout the day (EG = A1).

- a. Plan fluid intake as follows: 75%-80% delivered at meals, and 20%-25% delivered during non-meal times such as medication times and planned nourishment times (EG = D).
- b. Offer a variety of fluids keeping in mind the individual's previous intake pattern (EG = C1; EG = D). Alcoholic beverages which exert a diuretic effect on the resident should not be counted toward the fluid goal. Caffeinated beverages may be counted toward the fluid goal based on individual assessment, as there is preliminary evidence that in individuals who are regular users there are no untoward effects on fluid balance (see Appendix B in the original guideline document for Comparisons of Common Oral Fluids) (EG = A1; EG = C1).
- c. Fluid with medication administrations should be standardized to a prescribed amount (e.g., 180mL [6oz.] per administration time) (EG = B2).

4. Plan for at risk individuals

For residents who are at risk of underhydration because of poor intake, the following strategies can be implemented based on unit preference, time, and staffing issues:

- Fluid rounds mid-morning and late afternoon, where caregiver provides additional fluids (EG = B2).
- Provide 2-8 oz. glasses of fluid in AM and PM (EG = B2).
- "Happy Hours" in the afternoon, where residents can gather together for additional fluids and socialization (EG = C1)
- "Tea Time" in the afternoon, where residents come together for fluids, nourishment and socialization (EG = D)
- Use of modified fluid containers based on resident's intake behaviors (e.g., ability to hold cup, to swallow) (EG = D)
- Offer a variety of fluids and encourage ongoing intake throughout the day for cognitively impaired residents. Offer fluids that residents prefer (EG = C1)
- Offering encouragement to drink (EG = C1)
- Encourage family involvement and support (EG = C1).
- Coordinate staff communication about hydration such as certified nursing assistant (CNA) handoff reports or documentation in nursing care plan. (EG = C1)

5. Fluid regulation and documentation

- a. Individuals who are cognitively intact and visually capable can be taught how to regulate their intake through the use of a color chart (see Appendix A.3 in the original guideline document for description), to compare to the color of their urine. For those individuals who are cognitively impaired, caregivers can be taught how to use the color chart. The chart is most accurate in individuals with better renal function (EG = B2; EG = C1).
- b. Frequency of documentation of fluid intake will vary from setting to setting and is dependent on an individual's condition. However, in most settings at least one accurate intake and output recording should be documented and should include the amount of fluid consumed, intake pattern, difficulties with consumption, and a urine specific gravity and color (see Appendix A.4 in the original guideline document).
- c. Accurate calculation of intake requires knowledge of the volumes of containers used to serve fluids. This should be posted in a prominent place on the care unit as a study suggested that nurses over- or under-estimated the volumes of common vessels. (EG = C1)

Evaluation

Adherence to the hydration management guideline can be monitored by (frequency of monitoring to be determined by setting):

- Urine specific gravity checks, preferably a morning specimen (EG = C1; EG = A1)
- A value greater than or equal to 1.020 implies an underhydrated state and requires further monitoring (EG = B2; EG = C1)
- Urine color chart monitoring, preferably a morning specimen (EG = C1)
- 24 hour intake recording (output recording may be added, however in settings where individuals are incontinent of urine, an intake recording should suffice) (see Appendix A.4 in the original guideline document) (EG = A1)

Deviations from the guideline should be discussed with the individual's primary nurse and updated plans to manage hydration status will be implemented.

Definitions:

Rating Scheme for Strength of Evidence

A1 = Evidence from well-designed meta-analysis or well done systematic review with results that consistently support a specific action (e.g., assessment, intervention, or treatment)

A2 = Evidence from one or more randomized controlled trials with consistent results

B1 = Evidence from a high quality evidence-based practice guideline

B2 = Evidence from one or more quasi-experimental studies with consistent results

C1 = Evidence from observational studies with consistent results (e.g., correlational descriptive studies)

C2 = Inconsistent evidence from observational studies or controlled trials

D = Evidence from expert opinion, multiple case reports, or national consensus reports

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

- Hypertonic dehydration
- Hypotonic dehydration
- Isotonic dehydration

Note: For the purposes of this document, *hypertonic dehydration* is a depletion in total body water content due to pathologic fluid losses; *hypotonic dehydration* is depletion in both sodium and water with greater losses of sodium than water; and *isotonic dehydration* is a balanced depletion of water and sodium causing extracellular fluid loss.

This guideline does not include interventions for acute/emergent rehydration of elderly individuals.

Guideline Category

Evaluation

Management

Prevention

Risk Assessment

Clinical Specialty

Geriatrics

Nursing

Nutrition

Intended Users

Advanced Practice Nurses

Nurses

Physician Assistants

Physicians

Guideline Objective(s)

- To help health care providers in all settings determine adequate oral fluid intake for elders and to use strategies that will maintain hydration
- To prevent dehydration through careful assessment, identification of elders at risk for hydration problems, and implementation of individualized nursing interventions based on a risk profile
- To prevent hydration problems by outlining mechanisms for the provision of the appropriate amount of a variety of fluids to keep the aging body in an optimal state of hydration

Target Population

Elderly individuals

Interventions and Practices Considered

Assessment/Evaluation

1. Health history
2. Physical assessment
3. Laboratory tests
4. Functional assessments
5. Fluid intake behaviors
6. Risk identification

Management

1. Hydration management
 - Acute management of oral intake (close monitoring)
 - Ongoing management of oral intake (calculation of daily fluid goal, comparison of actual and calculated fluid intake, consistent provision of fluids, plan for individuals at risk, and documentation of fluid intake).
2. Evaluation (measurement of urine specific gravity, urine color chart monitoring, and 24 hour intake recording)

Major Outcomes Considered

- Body hydration
- Incidence of infections (e.g., urinary tract infections)
- Incidence of urinary incontinence
- Urinary pH
- Incidence of constipation
- Incidence of acute confusion

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Databases

Searches were performed using electronic database searching, hand searching of journals, national guideline, and professional organization. Databases included CINAHL, Medline/PubMed, Cochrane Database of Systematic Reviews, PsycINFO, Joanna Briggs Evidence Summaries.

Keywords

The following search terms were used: *dehydration, treatment of dehydration, under-hydration, hyponatremia, hypernatremia, volume depletion, dysphagia, drinking behavior, fluid intake, thirst, rehydration.*

Inclusion and Exclusion Criteria

The database searches were limited to year of publication (2004-present), research, peer reviewed, English only articles, aged, >65 years, geriatric, or nursing home. *Please note that this is an updated search since the revision of the guideline in 2004.*

Number of Source Documents

Number of documents identified: 149

Number of documents used: 50

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

A1 = Evidence from well-designed meta-analysis or well done systematic review with results that consistently support a specific action (e.g., assessment, intervention, or treatment)

A2 = Evidence from one or more randomized controlled trials with consistent results

B1 = Evidence from a high quality evidence-based practice guideline

B2 = Evidence from one or more quasi-experimental studies with consistent results

C1 = Evidence from observational studies with consistent results (e.g., correlational descriptive studies)

C2 = Inconsistent evidence from observational studies or controlled trials

D = Evidence from expert opinion, multiple case reports, or national consensus reports

Methods Used to Analyze the Evidence

Systematic Review

Description of the Methods Used to Analyze the Evidence

Not stated

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Experts in the subject of the proposed guideline are selected by the Research Translation and Dissemination Core to examine available research and write the guideline. Authors are given guidelines for performance of the systematic review of the evidence and in critiquing and weighing the strength of evidence.

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Internal review at John A. Hartford Foundation Center of Geriatric Nursing Excellence (HCGNE) and two external expert content reviewers (see the Contact Resources page in the original guideline document.)

This guideline was reviewed by experts knowledgeable about research on hydration management. The reviewers suggested additional evidence for selected actions, and changes in the guideline to enhance its clinical usefulness.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for most recommendations (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Use of this protocol will help prevent dehydration and associated conditions, such as acute confusion/delirium, adverse drug reactions, infections, and increased mortality associated with bladder cancer, coronary heart disease, and stroke.

Subgroups Most Likely to Benefit

The following screening criteria indicate patients who are likely to benefit the most from use of this protocol:

- All individuals >85 years of age
- All institutionalized elders
- Individuals with recent weight loss $\geq 5\%$ of body weight
- Individuals with feeding/eating difficulties
- Individuals with a diagnosis of dementia
- Individuals with congestive heart failure
- Febrile individuals

Potential Harms

Any patient who develops unexplained weight gain, pedal edema, neck vein distension or shortness of breath should be closely monitored for overhydration.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Audit Criteria/Indicators

Chart Documentation/Checklists/Forms

Quick Reference Guides/Physician Guides

Staff Training/Competency Material

For information about availability, see the *Availability of Companion Documents and Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Mentes JC, Kang S. Hydration management. Iowa City (IA): University of Iowa College of Nursing, John A. Hartford Foundation Center of Geriatric Nursing Excellence; 2011 Apr. 43 p. [136 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

1998 Sept (revised 2011 Apr)

Guideline Developer(s)

University of Iowa College of Nursing, John A. Hartford Foundation Center of Geriatric Nursing Excellence - Academic Institution

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Guideline Committee

The Iowa Veterans Affairs Nursing Research Consortium

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Financial Disclosures/Conflicts of Interest

Not stated

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Menten JC. Hydration management. Iowa City (IA): University of Iowa Gerontological Nursing Interventions Research Center, Research Dissemination Core; 2004 Feb. 43 p.

Guideline Availability

Electronic copies: Available for purchase on CD-ROM through [The University of Iowa College of Nursing's John A. Hartford Center for Geriatric Excellence Web site](#) .

Print copies: Available for purchase through [The University of Iowa College of Nursing's John A. Hartford Center for Geriatric Excellence Web site](#) .

Availability of Companion Documents

The following is available:

- Hydration management. Quick reference guide. Iowa City (IA): University of Iowa College of Nursing, John A. Hartford Foundation Center of Geriatric Nursing Excellence; 2011.

Print copies: Available from the University of Iowa College of Nursing, John A. Hartford Foundation Center of Geriatric Nursing Excellence, 4118 Westlawn, Iowa City, IA 52242. For more information, please see the [University of Iowa College of Nursing, John A. Hartford Foundation Center of Geriatric Nursing Excellence](#) .

In addition, process and outcome factors are available in the original guideline document.

The appendices to the original guideline document contain various forms and assessment tools, such as a hydration assessment form, the Armstrong urine color chart, a 24-hour intake and output record, a knowledge assessment test, and process and outcome monitors.

Patient Resources

None available

NGC Status

This summary was completed by ECRI on March 1, 1999. The information was verified by the guideline developer on May 5, 1999. This summary was updated by ECRI on June 8, 2004. The information was verified by the guideline developer on August 5, 2004. This NGC summary

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